

REMARKS

Claims 1-19 are pending in the present application.

Claim 1 has been amended to recite a specific amount of catalyst in the catalyst layer. Support for this amendment can be found in paragraph [0022].

Other changes to claim 1 have been made for clarity. Claims 12 and 16 have been changed to be in dependent form.

No new matter has been added by way of the above-amendment.

Prior Art Based Issues

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (US 2004/0115502) in view of Takeuchi et al. (US 4,894,355). Applicants respectfully traverse the rejection.

The present invention is drawn to an electric power generating element for a liquid fuel cell, comprising:

- a positive electrode for reducing oxygen,
 - the positive electrode having a catalyst layer with a thickness of 20 μm or more;
- a negative electrode for oxidizing fuel,
 - the negative electrode having a catalyst layer with a thickness of 20 μm or more,
 - *the catalyst layer of the negative electrode of the respective catalyst layers has a pore with a pore diameter in a range of 0.3 μm to 2.0 μm ,*
 - *the catalyst contained in the catalyst layer of the negative electrode is in an amount of 0.5 mg/cm^2 or more per unit area;* and
- a solid electrolyte placed between the positive electrode and the negative electrode;
- a pore volume of the pores in at least one of the catalyst layers is 4% or more with respect to a total pore volume.

In order to further distinguish the present invention from the cited references, Applicants have amended claim 1 to require that the catalyst layer having a pore with a pore diameter in a range of 0.3-2.0 microns is in the negative electrode. Also, claim 1 now

requires that the negative electrode has a catalyst in the catalyst layer in an amount of 0.5 mg/cm² or more per unit area.

As described in paragraphs [0013] to [0015], according to Fukuda et al.(US 2004/0115502), in order to obtain a membrane-electrode structure of a polymer electrolyte fuel cell capable of yielding excellent electric power generating performance even in the high current region, a pore diameter of a catalyst layer of a cathode electrode is controlled. On the other hand, Fukuda et al neither describes nor suggests a pore diameter of a catalyst layer of an anode electrode.

Furthermore, as described in paragraphs [0024] and [0029], in the polymer electrolyte fuel cell of Fukuda et al., fuel gas is supplied to the anode electrode and oxidant gas is supplied to the cathode electrode. Therefore, the catalyst layers of the respective electrodes are suitable for reacting gas. For example, as described in paragraphs [0066] and [0068], the catalyst amount of the catalyst layer of the anode electrode is 0.15 mg/cm² and the catalyst amount of the catalyst layer of the cathode electrode is 0.3 mg/cm². In the catalyst layer of the negative electrode supplied with liquid fuel as in the present invention, the liquid fuel cannot be used sufficiently for generating electric power with such a small amount of a catalyst.

On the other hand, according to the present invention, a pore diameter of the catalyst layer of the negative electrode and the pore volume thereof are optimized, and the amount of a catalyst thereof is optimized, whereby the use efficiency of the liquid fuel is enhanced, and the output density of the liquid fuel cell is increased. Thus, the present invention would not be obvious over Fukuda et al., because Fukuda et al. do not describe the control of the pore diameter of the catalyst layer of the anode electrode, and the catalyst layer would not be suitable for reacting fuel gas and oxidant gas at such a low catalyst concentration.

The Examiner, aware that Fukuda et al. do not teach or suggest the thickness of the catalyst layer, cites to Takeuchi et al. However, Applicants respectfully submit that Takeuchi et al. fail to cure the deficiencies of Fukuda et al. as explained above. As such, the present invention is patentable over the combined teachings of Fukuda et al. and Takeuchi et al.

Thus, it is clear that a *prima facie* case of obviousness does not exist, since all of the elements of the instantly claimed invention are neither taught nor suggested. In re Royka, 180

U.S.P.Q. 580 (CCPA 1974). Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 5 of the present invention is further distinguished from the combined teachings of Fukuda et al. and Takeuchi et al. Claim 5 of the present invention is characterized in that an oxidation catalyst layer for oxidizing liquid fuel is further placed between the solid electrolyte and the catalyst layer of the positive electrode". More specifically, the oxidation catalyst layer is provided separately from the catalyst layer of the positive electrode. In contrast, the "oxidation catalyst (4b)" indicated by the Examiner is a catalyst layer itself of the "cathode electrode (2b)," and hence, Fukuda et al. do not describe that an oxidation catalyst layer is provided separately from the catalyst layer of the cathode electrode.

Housekeeping

Applicants note *for a second time* that the PTO has not acknowledged the REVOCATION OF POWER OF ATTORNEY AND NEW POWER OF ATTORNEY form which was entered into PAIR on April 3, 2006. The Examiner is respectfully requested to take the steps necessary to have all future official communications addressed to:

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Information Disclosure Statements (IDS's)

It is noted from the signed copies of the PTO SB08 forms for the IDS's filed June 1, 2005, July 21, 2005 and December 14, 2006 that the Examiner has inserted the following statement "ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH." Unfortunately, this statement has been inserted on top of (i.e., covering) several entries of references on the forms, and as such, it may confuse the PTO's printer of patents. The following is an example of a section of a signed form obtained from PAIR:

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	CA	Abstract of JP2000353528 published on December 19, 2000, supplied from the esp@cenet database, 1 page	
	CB	Abstract of JO2001202970 published on July 27, 2001, supplied from the esp@cenet database, 1 page	
	CC	Abstract of JP2001021022 published on April 12, 2002, supplied from the esp@cenet database, 1 page	
	CD	Abstract of JP2002110202 published on April 12, 2002, supplied from the esp@cenet database, 1 page	
	CE	Abstract of JP2002134120 published on May 10, 2002, supplied from the esp@cenet database, 1 page	

The Examiner will note that the signature could be confused with a line-through by the PTO's printer.


Enclosed herewith are new copies of the PTO SB08 forms for the IDS's filed June 1, 2005, July 21, 2005 and December 14, 2006. The Examiner is requested to again initial and sign these documents so it will be clear to the PTO's printer of patents that all the references cited on the forms have been considered.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Registration No 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By  #43575

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Attachments: Copies of the PTO SB08 forms IDS's filed June 1, 2005, July 21, 2005 and
December 14, 2006